

CLAIMS

1. A microparticle production method of photo-pulverizing a substance in a solvent of a to-be-treated liquid to produce microparticles of the substance,

5 the microparticle production method comprising: a microparticulating step of using a to-be-treated body, which contains the substance and with which the solvent of the to-be-treated liquid is made solid, and illuminating a laser light of a predetermined wavelength onto the to-be-treated body to microparticulate the substance in the solvent.

10 2. The production method according to Claim 1, wherein the wavelength of the laser light used in the microparticulating step is not less than 900nm.

15 3. The production method according to Claim 1 or 2, wherein in the microparticulating step, the laser light illumination is performed while moving an illumination position of the laser light onto the to-be-treated body.

 4. The production method according to Claim 3, wherein in the microparticulating step, the illumination position is moved by changing the optical path of the laser light.

20 5. The production method according to any one of Claims 1 to 4, wherein in the microparticulating step, a result of monitoring a shock wave resulting from the microparticulation of the substance is referenced to determine an illumination condition of the laser light onto the to-be-treated body.

25 6. The production method according to any one of Claims 1 to 5, wherein the substance is a medicament.

7. The production method according to any one of Claims 1 to 6, wherein in the microparticulating step, a solidified body, which is the to-be-treated body containing the substance and with which the solvent is solidified by cooling the to-be-treated liquid, is used, and the substance in the solvent is microparticulated by illuminating the laser light onto the solidified body.

8. The production method according to Claim 7, further comprising: a gas eliminating step of eliminating a dissolved gas in the solvent before solidifying the solvent.

9. The production method according to Claim 7 or 8, further comprising: a particle dispersing step of dispersing raw material particles of the substance in the solvent before solidifying the solvent.

10. The production method according to any one of Claims 1 to 6, wherein in the microparticulating step, a gel raw material is dispersed in the solvent of the to-be-treated liquid, a gel body, which is the to-be-treated body containing the substance and with which the solvent, containing the gel raw material, is gelled, is used, and the laser light is illuminated onto the gel body to microparticulate the substance in the solvent.

11. The production method according to Claim 10, wherein an external-environment responsive type gel raw material is used as the gel raw material.

12. The production method according to Claim 10 or 11, wherein in the microparticulating step, an electric field is applied inside the gel body to perform at least one of separation, classification, and enrichment of the microparticles.

13. The production method according to any one of Claims 10 to 12, wherein in the microparticulating step, a second gel body that does not contain the substance is connected to the gel body and the microparticles formed in the gel body are moved and stored into the second gel body by electrophoresis.

14. The production method according to any one of Claims 10 to 13, wherein in the microparticulating step, the temperature of the gel body is cooled.

15. A microparticle production apparatus that photo-pulverizes a substance in a solvent of a to-be-treated liquid to produce microparticles of the substance, the microparticle production apparatus comprising:

a treatment chamber, containing the to-be-treated liquid;

a cooling means, cooling the to-be-treated liquid and solidifying the solvent to form a solidified body that is a to-be-treated body containing the substance;

a solidified state maintaining means, maintaining the solvent in the solidified state in the solidified body; and

a laser light source, illuminating a laser light of a predetermined wavelength, for microparticulating the substance in the solvent, onto the solidified body contained in the treatment chamber.

16. The production apparatus according to Claim 15, further comprising: a gas eliminating means for eliminating a dissolved gas in the solvent before solidifying the solvent.

17. The production apparatus according to Claim 15 or 16, further comprising: a particle dispersing means for dispersing raw

material particles of the substance in the solvent before solidifying the solvent.

18. A microparticle production apparatus that photo-pulverizes a substance in a solvent of a to-be-treated liquid to produce microparticles of the substance, the microparticle production apparatus comprising:

a treatment chamber, containing a gel body, which is a to-be-treated body containing the substance and with which the solvent of the to-be-treated liquid, containing a gel raw material, is gelled; and

a laser light source, illuminating a laser light of a predetermined wavelength, for microparticulating the substance in the solvent, onto the gel body contained in the treatment chamber.

19. The production apparatus according to Claim 18, further comprising: an electric field applying means that applies an electric field inside the gel body to perform at least one of separation, classification, and enrichment of the microparticles.

20. The production apparatus according to Claim 18 or 19, further comprising: a cooling means that cools the temperature of the gel body; and a cooled state maintaining means that maintains the gel body in the cooled state.

21. The production apparatus according to any one of Claims 15 to 20, wherein the wavelength of the laser light illuminated from the laser light source is not less than 900nm.

22. The production apparatus according to any one of Claims 15 to 21, wherein illumination of the laser light is performed while moving an illumination position of the laser light onto the to-be-treated

body.

23. The production apparatus according to Claim 22, further comprising: an optical path changing means that moves the illumination position by changing an optical path of the laser light from the laser light source to the treatment chamber.

24. The production apparatus according to any one of Claims 15 to 23, further comprising: a shock wave monitoring means that monitors a shock wave resulting from microparticulation of the substance.

25. The production apparatus according to any one of Claims 15 to 24, wherein the substance is a medicament.

26. Microparticles produced by the microparticle production method according to any one of Claims 1 to 14.